

**WHAT IS CLAIMED IS:**

1. A method for illuminating an object comprising the following steps:
  - generating a light beam with a laser,
  - injecting the light beam into a optical element which spectrally broadens the light of the light beam and
  - shaping the spectrally broadened light beam to form an illumination light beam.
2. Method according to Claim 1, further comprising the step:
  - adjusting the pulse width of the light pulses.
3. Method according to Claim 1, wherein the optical element consists of photonic band gap material ,
4. Method according to Claim 1, wherein the optical element consists of a tapered optical fiber.
5. An illuminating instrument comprising: a laser that emits a light beam, a optical element that spectrally broadens the light from the laser and a optical means for shaping the spectrally broadened light into an illumination light beam.
6. Illuminating instrument according to Claim 5, wherein the optical element consists of photonic band gap material ,
7. Illuminating instrument according to Claim 5, wherein the optical element consists of a tapered optical fiber.
8. An illuminating device comprising: a laser, a microstructured optical element on which the light beam is directed and wherein the microstructured optical element spectrally broadens the light beam and a casing, defining an exit

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opening from which the spectrally broadened light beam emerges and wherein the laser and the microstructured optical element are arranged within the casing.

9. An illuminating device comprising: a laser, a tapered optical fiber into which the light beam is coupled and wherein the tapered optical fiber spectrally broadens the light beam and a casing, defining an exit opening from which the spectrally broadened light beam emerges and wherein the laser and the tapered optical fiber are arranged within the casing.

10. A microscope comprising: an illuminating device for illuminating a preparation having a laser and a optical element on which the light beam is directed, wherein the optical element spectrally broadens the light beam.

11. Microscope according to Claim 10, wherein the microscope is a confocal scanning microscope.

12. Microscope according to Claim 10, wherein the optical element produces entangled photons.

13. A microscope comprising: an objective through which a sample can be illuminated and detected, the objective being arranged in both an illumination beam path and a detection beam path, an illumination pinhole being arranged in the illumination beam path, a detection pinhole being arranged in the detection beam path, an optical component arranged in the illumination beam path, which generates spectrally broadened illumination light, and an essentially polarization-independent and wavelength-independent beam splitter, which is arranged in a fixed position in the illumination beam path and the detection beam path.